

## Darkwinged *Heleniella* Gowin, 1943 from Thailand and China

(Insecta, Diptera, Chironomidae, Orthoclaadiinae)

Trond Andersen and Xinhua Wang

Andersen, T. & X. Wang (1997): Darkwinged *Heleniella* Gowin, 1943 from Thailand and China. (Insecta, Diptera, Chironomidae, Orthoclaadiinae). – *Spixiana* 20/2: 151-160

*Heleniella nebulosa*, spec. nov. from northern Thailand is described in both sexes, and the occurrence of intersexes is commented on. A *Heleniella* female from China, most probably representing a separate species, is also described.

Trond Andersen, Museum of Zoology, University of Bergen, Muséplass 3, N-5007 Bergen, Norway.

Xinhua Wang, Department of Biology, University of Nankai, Tianjin, 300071, P. R. China.

### Introduction

According to Cranston et al. (1989) the genus *Heleniella* Gowin, 1943, is Holarctic in distribution, with 5 species described from the Palaearctic region, 2 species from the Nearctic region and one from the Oriental region. Later, two new species with dark spotted wings have been described from Japan, *H. osarumaculata* Sasa, 1988 and *H. otujimaculata* Sasa et Okazawa, 1994: 77 (syn: *H. otujisecunda* Sasa et Okazawa, 1994: plate 6 fig. 9; Sasa et Kikuchi 1995). The oriental species, *H. asiatica* Reiss, 1968, is described from Tshola Tso (4.500 m a.s.l.) in Nepal (Reiss 1968).

During an excursion to the northern parts of Thailand in spring 1991, adult chironomids were collected both with sweep nets and Malaise traps, and a few larvae were taken with drift nets. The chironomid fauna of Thailand is apparently very superficially known (Giani & Bouguenec 1988, Moubayed 1988). During our excursion an undescribed, darkwinged *Heleniella* species was taken in Malaise traps at a small stream in a rainforest area in the Doi Suthep mountain near Chiang Mai. Additional material of the new species collected by Hans Malicky in northern Thailand and lodged in the Zoologische Staatssammlung, Munich, is also included. In addition, one female from Mt. Jinpo, Sichuan province in China, most probably representing a different species, is described here.

### Methods and terminology

The material examined was mounted on slides in Canadabalsam following the procedure outlined by Sæther (1969). The general terminology follows Sæther (1980) except that the apodeme lobe of the female genitalia is regarded as primarily belonging to gonapophysis IX (not VIII) in accordance with Sæther (1990). The measurements are given as ranges followed by a mean, when four or more measurements are made.

The holotype and paratypes of *H. nebulosa*, spec. nov. are deposited in the Museum of Zoology, University of Bergen, Norway (ZMBN); paratypes are also lodged in the Zoologische Staatssammlung, Munich, Germany, and in the collection of Xinhua Wang, Nankai University, Tianjin, P. R. China. The *Heleniella* female from China is in the collection of Xinhua Wang.

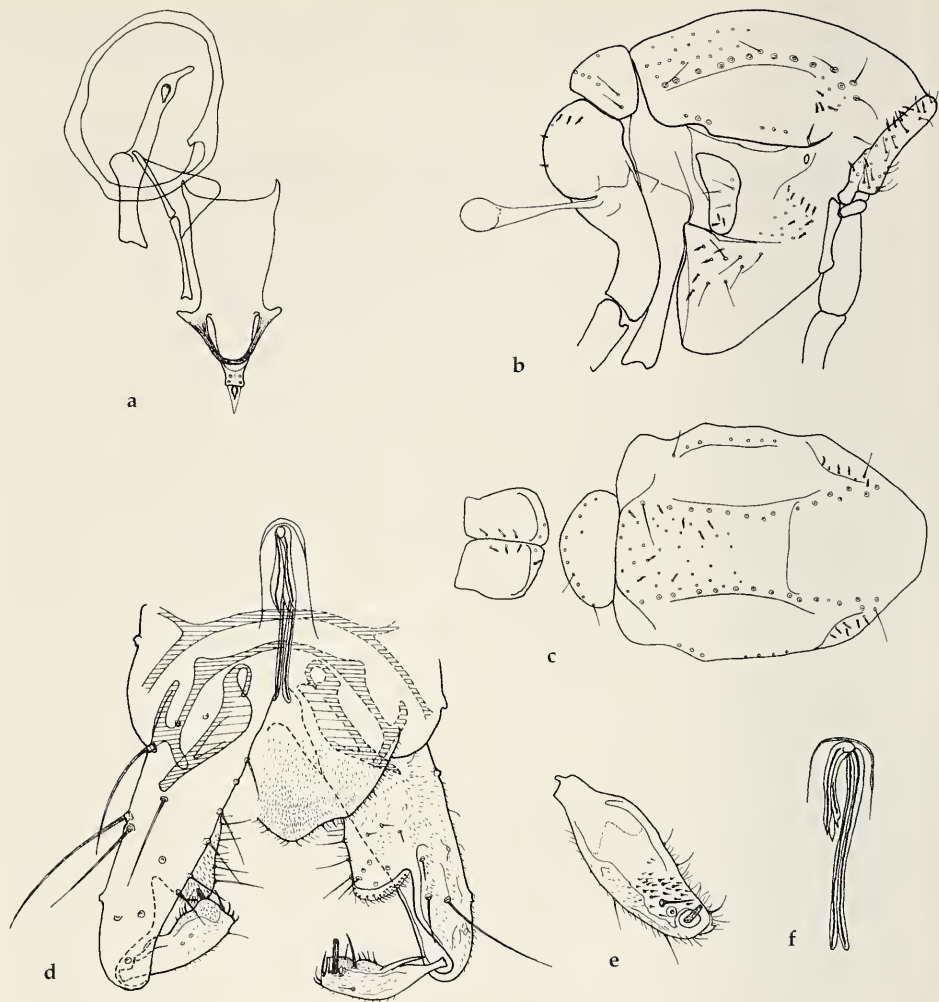


Fig. 1. *Heleniella nebulosa*, spec. nov., ♂. a. Cibarial pump, tentorium, stipes and pedicel. b. Thorax, lateral view. c. Thorax, dorsal view. d. Hypopygium, dorsal aspect right, ventral aspect left. e. Gonostylus, dorsal view. f. Virga, lateral view.

*Heleniella nebulosa*, spec. nov.

Figs 1-3, 4a-c

**Type material.** Holotype: ♂, THAILAND, Chiang Mai province, Doi Suthep, approx. 1 km northwest of Wat Phra That temple, Malaise trap, 9.-15.III.1991, T. Andersen & G. E. E. Soli leg. (ZMBN Type no. 166, on slide). - Paratypes: 18♂♂, 15♀♀, 6 intersex ♂♂, as holotype; 45♂♂, 14♀♀, as holotype except Chiang Mai, Chiang Mai Zoo, 400 m a.s.l., light trap, III.1988-II.1989, H. Malicky leg.; 4♂♂, 10♀♀, as holotype except Doi Inthanon, VIII.1989-III.1990, H. Malicky leg.; 10♂♂, 4♀♀, as holotype except Doi Inthanon, Bang Khun Klang, 98°31'E, 18°32'N, 1,200 m a.s.l., 5.-12.IX.1989, H. Malicky leg.

**Diagnostic characters.** The greyish-black coloured spots forming two dark bands across the wing separate *H. nebulosa*, spec. nov. from all other *Heleniella* species except *H. osarumaculata* and *H. otujima-*

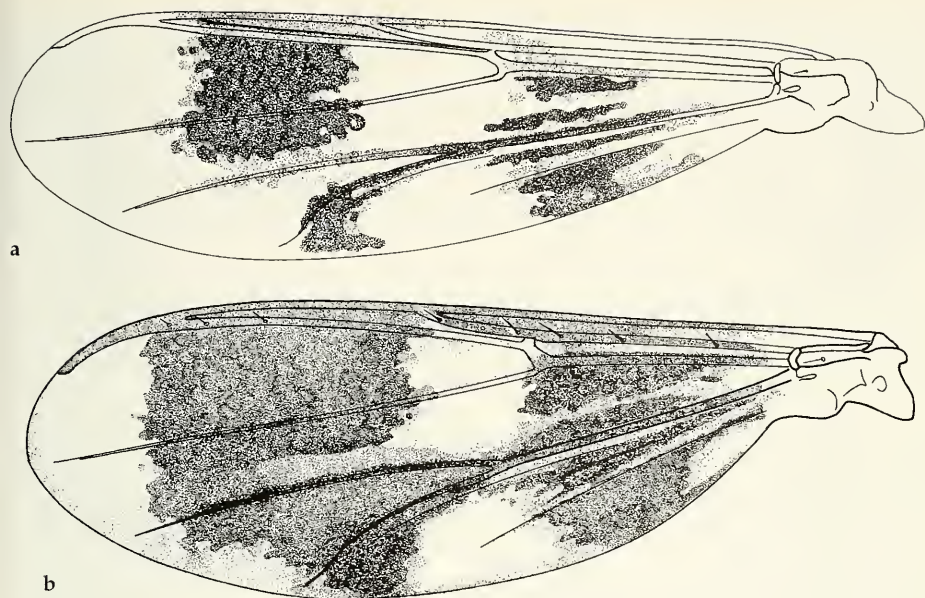


Fig. 2. *Heleniella nebulosa*, spec. nov., wing. a. ♂. b. ♀.

*culata*. Among the latter *H. nebulosa* may be identified by the lanceolate humerals and the lanceolate setae on anteprepronotum, anepisternum II, median anepisternum II and postnotum, by the triangular inferior volsella, and by the shape of virga apparently composed of two long and three short spines.

**Etymology.** From Latin *nebulosus* cloudy, dark, referring to the greyish-black coloured spots on the wings.

### Description

**Male** (n=15, if not otherwise stated). Total length 1.64-2.12, 1.82 mm. Wing length 0.92-1.24, 1.04 mm. Total length/wing length 1.70-1.95, 1.80. Wing length/length of profemur 2.36-2.77, 2.53. Colouration blackish brown; femur of all legs brown, tibia and tarsi light brown.

Head (Fig. 1a). AR 0.44-0.72, 0.55 (n=30). Antenna with 13 segments. Thirteenth flagellomere 165-288, 219  $\mu\text{m}$  (n=30). Temporal setae 8-14, 10 in single row; including 3-6, 5 inner verticals; 1-3, 2 outer verticals; and 2-6, 3 postorbitals. Clypeus with 7-11, 8 setae. Cibarial pump, tentorium, stipes and pedicel as in Fig. 1a. Tentorium 92-117, 102  $\mu\text{m}$  long; 14-24, 19  $\mu\text{m}$  wide. Stipes 73-91, 78  $\mu\text{m}$  long; 24-38, 31  $\mu\text{m}$  wide. Palp segment lengths (in  $\mu\text{m}$ ): 16-26, 22; 24-36, 29; 49-71, 59; 52-77, 66; 104-137, 122. Apex of third segment with 1-2 sensilla clavata on the outside and 1-2 on the inside, 10-13, 11  $\mu\text{m}$  long; apex of fourth segment apparently with 0-1 sensillum clavatum on the outside.

Thorax (Fig. 1b-c). Anteprepronotum with 30-48, 39 setae; of which 15-25, 18 hair-like, sitting mostly along anterior margin; and 15-27, 21 lanceolate along posterior margin. Dorsocentrals 37-57, 47; including 6-17, 11 lanceolate humerals; 14-25, 18 strong setae uniserial, sometimes biserial at anterior end; and 11-22, 17 lanceolate prescutellars. Humeral pit variable, most specimens with distinct margins and lanceolate setae confined to pit, other specimens less distinct, with lanceolate setae more spread towards or even in between anterior strong dorsocentrals. Prealars with 7-10, 9 strong setae in one line, usually separated in one anterior and one posterior group. Anepisternum II with 10-23, 16 small lanceolate setae. Median anepisternum II with 7-15, 10 setae; including 3-8, 5 posteroventral lanceolate setae; and 3-8, 5 stronger anterodorsal setae. Preepisternum with 11-24, 16 setae; including 5-11, 7 weak, posterodorsal, lanceolate setae; and 5-14, 9 stronger, dorsomedian setae. Scutellum with 10-23, 15 strong setae. Postnotum with 4-9, 5 dorsal and posterior, lanceolate setae on each side.

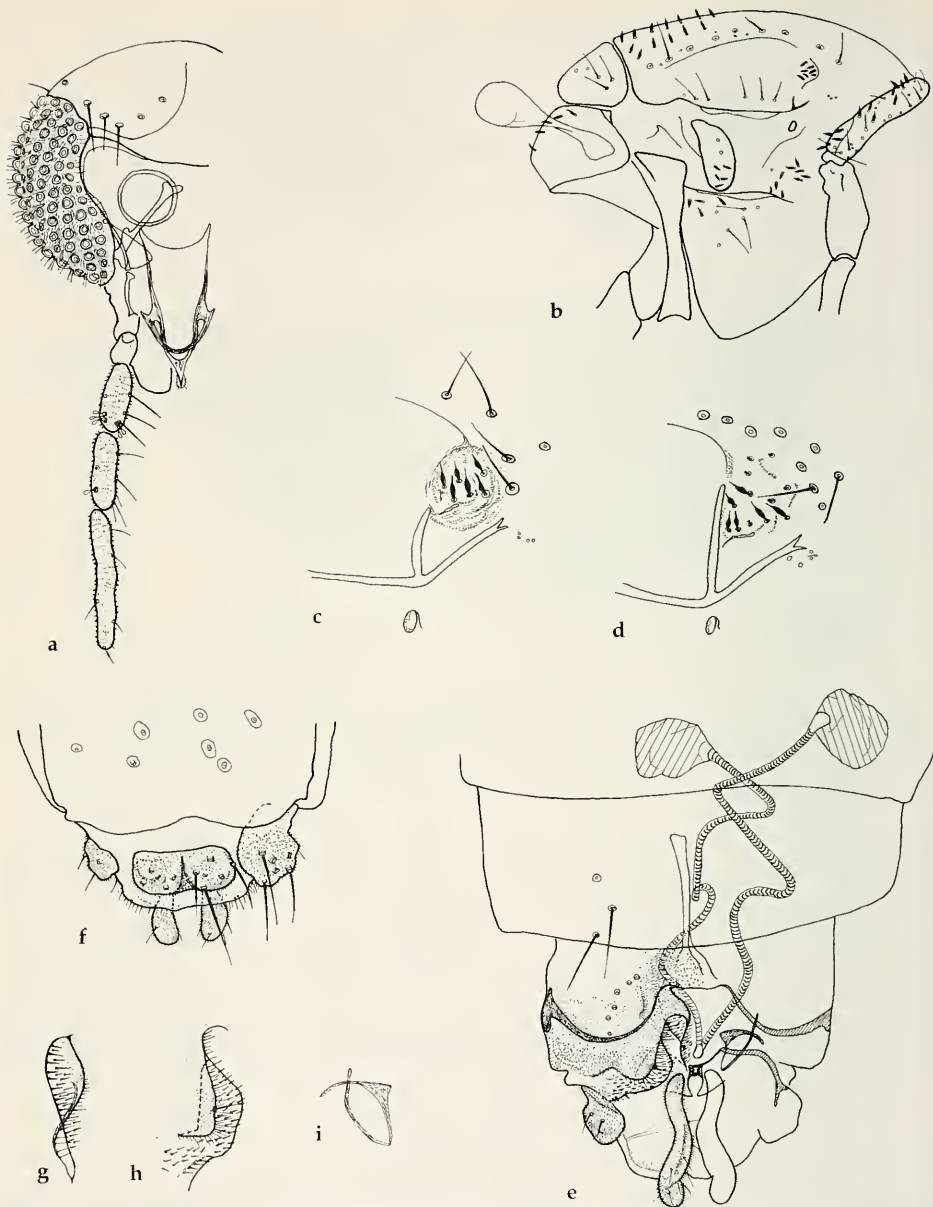


Fig. 3. *Heleniella nebulosa*, spec. nov., ♀. a. Head. b. Thorax, lateral view. c-e. Humeral area. e. Genitalia, ventral view. f. Genitalia, dorsal view. g. Dorsomesal lobe. h. Ventrolateral lobe. i. Apodeme lobe.

Wing (Fig. 2a). VR 1.14-1.26, 1.21. Costa extension 82-123, 101  $\mu\text{m}$  long,  $R_{2+3}$  ends at  $\frac{3}{4}$  to  $\frac{4}{5}$  the distance between  $R_1$  and  $R_{4+5}$ . Anal lobe reduced. Brachiolum with 1 setae. Wings with greyish-black coloured spots forming two dark bands across the wing as in Fig. 2a.

Legs. Spurs of front tibia 21-33, 27  $\mu\text{m}$  long; spurs of middle tibia 8-13, 11  $\mu\text{m}$  and 14-18, 16  $\mu\text{m}$  long; of hind tibia 10-15, 12  $\mu\text{m}$  and 32-44, 38  $\mu\text{m}$  long. Width at apex of front tibia 21-28, 25  $\mu\text{m}$ ; of middle tibia 24-29, 25  $\mu\text{m}$ ; of hind tibia 28-36, 32  $\mu\text{m}$ . Comb of 13-14, 13 setae; shortest setae 16-23, 19  $\mu\text{m}$ , longest setae 34-48, 41  $\mu\text{m}$  long. Sensilla chaetica lacking. Lengths (in  $\mu\text{m}$ ) and proportions of legs:

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>
P <sub>1</sub>	364-484, 408	431-596, 495	259-368, 297	150-216, 176	109-156, 127	67-84, 74
P <sub>2</sub>	375-492, 420	353-480, 401	180-228, 198	86-120, 103	64- 90, 72	30-43, 35
P <sub>3</sub>	371-488, 420	401-548, 457	210-304, 248	109-156, 126	83-120, 98	38-52, 42
	ta <sub>5</sub>	LR	BV	SV	BR	
P <sub>1</sub>	44-60, 52	0.57-0.62, 0.60	2.61-2.98, 2.80	2.90-3.23, 3.05	2.0-2.7, 2.20	
P <sub>2</sub>	34-49, 41	0.47-0.53, 0.49	3.79-4.28, 4.15	3.96-4.41, 4.16	2.2-2.8, 2.49	
P <sub>3</sub>	36-53, 44	0.52-0.58, 0.54	3.43-3.69, 3.60	3.30-3.70, 3.54	2.4-3.0, 2.65	

Hypopygium (Fig. 1d-f). Anal point proper lacking, tergum IX with small, rounded tip with 6-19, 13 weak setae; laterosternite IX with 2-4, 3 strong setae. Phallapodeme 55-69, 61  $\mu\text{m}$  long; transverse sternapodeme 45-61, 51  $\mu\text{m}$  long. Virga 58-77, 67  $\mu\text{m}$  long, apparently with two long and three shorter spines; at least the two long spines composed of two to four thinner fibre-like spines. Gonocoxite 113-135, 125  $\mu\text{m}$  long; with well developed, triangular inferior volsella. Gonostylus 45-59, 50  $\mu\text{m}$  long; megaseta 11-14, 12  $\mu\text{m}$  long. HR 2.238-2.71, 2.49; HV 3.59-3.85, 3.70.

**Female** (n=15). Total length 1.43-2.06, 1.65 mm. Wing length 0.88-1.23, 1.00 mm. Total length/wing length 1.37-1.82, 1.64. Wing length/length of profemur 2.48-3.03, 2.73. Colouration blackish brown; femur of all legs brown, tibia and tarsi light brown.

Head (Fig. 3a). AR 0.29-0.44, 0.38. Lengths of flagellomeres (in  $\mu\text{m}$ ): 40-75, 60; 31-40, 35; 31-40, 35; 33-40, 35; 47-79, 63. Temporal setae 5-12, 8 in single row; including 2-4, 3 inner verticals; 1-2, 1 outer verticals; and 2-4, 3 postorbitals. Clypeus with 6-12, 9 setae. Tentorium 81-94, 85  $\mu\text{m}$  long; 10-19, 13  $\mu\text{m}$  wide. Stipes 68-79, 74  $\mu\text{m}$  long; 22-38, 31  $\mu\text{m}$  wide. Palp segment lengths (in  $\mu\text{m}$ ): 17-23, 20; 19-28, 24; 47-59, 51; 55-73, 60; 97-125, 111. Apex of third segment with 2-3 sensilla clavata on the outside and 2 on the inside; apex of fourth segment with 1 sensillum clavatum on the outside.

Thorax (Fig. 3b-d). Antepronotum with 26-59, 39 setae; of which 12-26, 18 hair-like, sitting mostly along anterior margin; and 11-33, 20 lanceolate along posterior margin. Dorsocentrals 32-81, 43; including 6-37, 13 lanceolate humerals; 8-26, 15 strong setae uniserial, sometimes biserial at anterior end; and 8-22, 16 lanceolate prescutellars. Humeral pit variable (Fig. 3c-d), most specimens with distinct margins and lanceolate setae confined to pit, other specimens less distinct, with lanceolate setae more spread towards or even in between anterior strong dorsocentrals. Prealars with 6-16, 8 strong setae in one line, usually separated in one anterior and one posterior group. Anepisternum II with 11-35, 19 small lanceolate setae. Median anepisternum II with 5-13, 7 setae; including 2-8, 4 posteroventral lanceolate setae; and 2-5, 3 stronger anterodorsal setae. Preepisternum with 7-31, 12 setae; including 2-17, 6 weak, posterodorsal, lanceolate setae; and 2-14, 6 stronger, dorsomedian setae. Scutellum with 8-30, 14 strong setae. Postnotum with 3-9, 6 dorsal and posterior, lanceolate setae on each side.

Wing (Fig. 2b). VR 1.26-1.33, 1.29. Costa extension 132-196, 151  $\mu\text{m}$  long. Anal lobe reduced. R with 3-9, 6 setae; R<sub>1</sub> with 1-3, 2; R<sub>4+5</sub> with 1-4, 3; and costa extension beside marginal setae with 6-12, 10 setae. Squama lacking setae, brachiolum with 1 setae. Wings with greyish-black coloured bands forming two dark bands across the wing as in Fig. 2b.

Legs. Spurs of front tibia 12-18, 15  $\mu\text{m}$  long; spurs of middle tibia 11-16, 14  $\mu\text{m}$  and 17-21, 20  $\mu\text{m}$  long; of hind tibia 19-23, 20  $\mu\text{m}$  and 33-42, 35  $\mu\text{m}$  long. Width at apex of front tibia 21-28, 24  $\mu\text{m}$ ; of middle tibia 23-29, 26  $\mu\text{m}$ ; of hind tibia 28-36, 32  $\mu\text{m}$ . Comb of 13-14, 13 setae; shortest setae 17-26, 18  $\mu\text{m}$ , longest setae 37-45, 40  $\mu\text{m}$  long. Sensilla chaetica lacking. Lengths (in  $\mu\text{m}$ ) and proportions of legs:

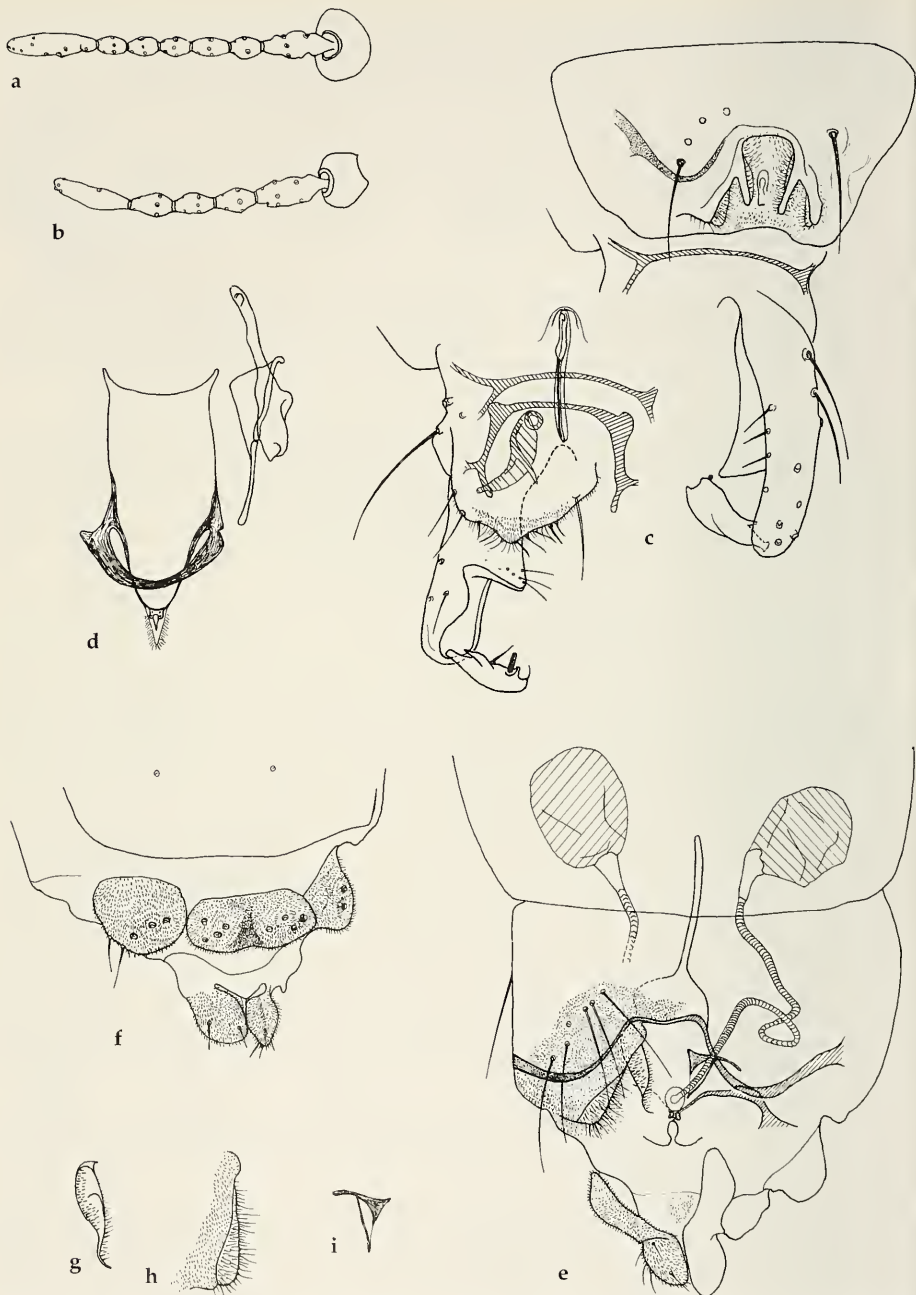


Fig. 4a-c. *Heleniella nebulosa*, spec. nov., intersex. a. Antenna, seven segmented. b. Antenna, five segmented. c. Abdomen, dorsal aspect left, ventral aspect right. d-i. *Heleniella* sp., ♀. d. Cibarial pump, tentorium and stipes. e. Genitalia, ventral view. f. Genitalia, dorsal view. g. Dorsomesal lobe. h. Ventrolateral lobe. i. Apodeme lobe.

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>
P <sub>1</sub>	326-436, 375	398-524, 445	233-336, 262	135-184, 155	90-124, 103	49-72, 59
P <sub>2</sub>	338-428, 377	330-412, 362	154-204, 173	76- 96, 83	49- 76, 58	26-32, 29
P <sub>3</sub>	345-428, 382	360-472, 411	188-280, 218	94-132, 111	79-100, 86	30-38, 34
	ta <sub>5</sub>	LR	BV	SV	BR	
P <sub>1</sub>	46-54, 48	0.58-0.65, 0.59	2.81-3.19, 2.97	2.85-3.40, 3.13	1.7-2.1, 1.89	
P <sub>2</sub>	32-41, 38	0.45-0.49, 0.47	4.05-4.83, 4.38	4.07-4.46, 4.28	1.9-2.3, 2.01	
P <sub>3</sub>	38-46, 43	0.50-0.59, 0.52	3.46-3.81, 3.69	3.20-3.88, 3.65	1.9-2.3, 2.12	

Abdomen. Number of setae on tergites I-VIII as: 6-11, 8; 6-9, 7; 7-10, 8; 6-13, 9; 6-12, 9; 6-12, 9; 6-11, 8; 5-10, 7. Number of setae on sternites I-VII as: 0; 2-4, 3; 2-5, 4; 2-6, 5; 2-6, 4; 3-7, 4; 3-6, 4. On sternite VIII 10-16, 13 setae; 3-6, 4 on each side of the genital fissure, and 1-3, 2 along lateral margin.

Genitalia (Fig. 3e-i). Gonocoxite IX with 5-9, 7 long setae. Tergite IX divided, with 8-12, 9 setae. Cercus 77-92, 83  $\mu$ m long; 21-26, 23  $\mu$ m wide at apex (n=10); and with 16-29, 21 setae. Seminal capsule 64-75, 67  $\mu$ m long including a 10-14, 12  $\mu$ m long neck; sclerotized in apical 45-64, 51  $\mu$ m; 35-49, 43  $\mu$ m wide. Gonapophysis IX notum 66-99, 81  $\mu$ m long.

**Intersex.** Of the 25 males taken in the Malaise trap near Wat Phra That temple in April 1991, six (24 %) are apparently intersexes. One of these intersexes has a 13 segmented antenna and is morphologically similar to the males, except that the virga is deformed and seems not to connect with the genital fissure; the AR is 0.44, the last flagellomere is 157  $\mu$ m. One male lack virga and has a 12 segmented antenna; the AR is 0.44, the last flagellomere is 206  $\mu$ m long. One male lack virga and has a 7 segmented antenna (Fig. 4a). Three males have five segmented antenna (Fig. 4b), one of these lack virga and one has a very short, deformed virga. The last one has a virga nearly as long as the normal males, but in addition to male hypopygium it also has female structures on sternite VIII (Fig. 4c). Several of the intersexes have a few strong setae on tergum IX. However, the bristle ratio of the front leg falls within the range of the males for all the intersexes.

Some of the intersexes are small compared to the other males from the same locality (Tab. 1). The specimen with 12 segmented antenna (intersex no. 2) even fall outside the range of the females with respect to total length and wing length. In other measurements, like the 5th palp segment length of the intersex with 7 segmented antenna (intersex no. 3) the segment is longer than in the largest male. Approximately 50 % of the ratios concerning body dimensions fall outside the range of the males, and several even falls outside the range of the females. Considering the hypopygium, most of the intersexes have a reduced phallapodeme and transverse sternapodeme. The three intersexes with 5 segmented antenna (intersex no. 4, 5 and 6) have a comparatively short gonocoxite; the gonostylus length falls within the range of the males for all the intersexes except for the intersex with 7 segmented antenna (intersex no. 3), which has an even longer gonostylus than the largest male. None of the males from the other localities appear to be intersexes.

### *Heleniella* sp.

Fig. 4d-i

**Material examined:** 1♀, CHINA, Sichuan province, Mt. Jinpo, 5.X.1986, X. Wang leg.

### Description

**Female** (n=1). Total length 2.11 mm. Wing length 1.35 mm. Total length/wing length 1.67. Wing length/length of profemur 3.11. Colouration blackish brown.

Head (Fig. 4d). AR 0.42. Lengths (in  $\mu$ m) of flagellomeres: 68, 40, 40, 42, 80. Temporal setae 7 in single row, including 3 inner verticals, 2 outer verticals, and 2 postorbitals. Clypeus with 15 setae. Cibarial pump, tentorium and stipes as in Fig. 4d. Tentorium 96  $\mu$ m long, 15  $\mu$ m wide. Stipes 87  $\mu$ m long, 24  $\mu$ m wide. Palp segment lengths (in  $\mu$ m): 26, 28, 52, 73, 127. Apex of third segment with 2 sensilla clavata on the outside and 2 on the inside.

Thorax. Antepnotum with 38 setae, of which 18 hair-like, sitting mostly along anterior margin, and 19 lanceolate along posterior margin. Dorsocentrals 45, including 11 lanceolate humerals, 17 strong

setae uniserial, biserial at anterior end, and 17 lanceolate prescutellars. Humeral pit less distinct, with lanceolate setae more spread towards anterior strong dorsocentrals. Prealar with 7 strong setae in one line, in two groups of 3 and 4 setae. Anepisternum II with 15 small lanceolate setae; median anepisternum II with 8 setae, including 3 posteroventral lanceolate setae, and 5 stronger anterodorsal setae. PEEPisternum with 11 setae, including 3 weak, posterodorsal, lanceolate setae, and 8 stronger, dorso-medial setae. Scutellum with 12 strong setae. Postnotum with 5 dorsal and posterior, lanceolate setae on each side.

Wing. VR 1.27. Costa extension 174  $\mu\text{m}$  long. Anal lobe reduced. R with 9 setae, R<sub>1</sub> with 3, R<sub>4+5</sub> with 4, and costa extension beside marginal setae with 10 setae. Squama lacking setae, brachiolum with 1 setae. Wings with dark brown bands, similar to the wings marks in the female of *H. nebulosa*, spec. nov.

Legs. Spurs of front tibia 15  $\mu\text{m}$  long, spurs of middle tibia 11  $\mu\text{m}$  and 15  $\mu\text{m}$  long, of hind tibia 11  $\mu\text{m}$  and 35  $\mu\text{m}$  long. Width at apex of front tibia 23  $\mu\text{m}$ , of middle tibia 26  $\mu\text{m}$ , of hind tibia 35  $\mu\text{m}$ . Comb of 12 setae, shortest setae 19  $\mu\text{m}$ , longest setae 38  $\mu\text{m}$  long. Sensilla chaetica lacking. Lengths (in  $\mu\text{m}$ ) and proportions of legs:

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV	BR
p <sub>1</sub>	431	488	338	197	131	75	47	0.69	2.72	2.72	1.9
p <sub>2</sub>	420	443	199	113	71	36	38	0.48	4.13	4.05	2.0
p <sub>3</sub>	454	510	281	146	109	45	43	0.55	3.65	3.57	2.9

Abdomen. Number of setae on tergite and sternite VIII: 8 and 16, respectively.

Genitalia (Fig. 4e-i). Gonocoxite IX with 7 long setae. Tergite IX divided, with altogether 8 setae. Cercus 89  $\mu\text{m}$  long. Seminal capsule 87  $\mu\text{m}$  long including 19  $\mu\text{m}$  neck, sclerotized in apical 64  $\mu\text{m}$ , 61  $\mu\text{m}$  wide. Gonapophysis IX notum 85  $\mu\text{m}$  long.

**Tab. 1.** *Heleniella nebulosa* spec. nov. Selected measurements and ratios of the six intersexes from the Malaise trap catches near Wat Phra That temple, Doi Suthep, Northern Thailand 9.-15.III.1991, compared to range of the males and females from the same cathes. (segm.=segment, transv.=transverse)

	Males	Intersex no.						Females
	(n=10)	1	2	3	4	5	6	(n=10)
No. antennae segm.	13	13	12	7	5	5	5	5
Total length (mm)	1.64-1.86	1.66	1.40	1.67	1.57	1.57	1.72	1.52-1.66
Wing length (mm)	0.92-1.09	0.88	0.86	1.00	0.92	1.00	0.97	0.88-0.98
5th palp segm. length ( $\mu\text{m}$ )	104-134	115	98	139	104	113	108	97-125
Fe-p <sub>1</sub> length ( $\mu\text{m}$ )	364-450	364	338	383	356	383	383	326-379
Ti-p <sub>1</sub> length ( $\mu\text{m}$ )	431-551	439	401	450	428	443	428	398-446
Phallapodeme length ( $\mu\text{m}$ )	55-64	59	49	42	28	35	48	-
Transv. sternapodeme length ( $\mu\text{m}$ )	45-59	52	44	47	33	42	56	-
Virga length ( $\mu\text{m}$ )	64-75	54	-	-	-	16	59	-
Gonocoxite length ( $\mu\text{m}$ )	113-127	113	113	120	106	104	106	-
Gonostylus length ( $\mu\text{m}$ )	45-51	48	47	52	45	45	45	-
Total length/Wing length	1.71-1.86	2.01	1.66	1.68	1.71	1.57	1.77	1.57-1.77
Wing length/Fe-p <sub>1</sub> length	2.41-2.58	2.42	2.67	2.61	2.58	2.61	2.53	2.48-2.77
LR-p <sub>1</sub>	0.57-0.62	0.62	0.58	0.59	0.59	0.60	0.65	0.58-0.61
BV-p <sub>1</sub>	2.61-2.89	2.71	2.85	2.93	2.97	3.25	2.82	2.81-3.01
SV-p <sub>1</sub>	2.94-3.23	2.97	3.18	3.13	3.27	3.10	2.92	3.03-3.26
BR-p <sub>1</sub>	2.0-2.7	2.2	2.0	2.2	2.2	2.3	2.0	1.7-2.1
HR	2.38-2.70	2.34	2.40	2.32	2.37	2.32	2.37	-
HV	3.59-3.81	3.44	2.97	3.23	3.51	3.51	3.85	-



## Discussion

The new species can easily be separated from most *Heleniella* species on the dark wing marks; the only two described *Heleniella* species with dark coloured wings are *H. osarumaculata* and *H. otujimaculata*, both from Japan. Unfortunately, type material of both species is apparently not available for loan. However, according to the description and figures of the male of *H. osarumaculata* (Sasa, 1988: 39, plate 10A3; Sasa & Kikuchi 1995: 191, plate 68C) and of the male of *H. otujimaculata* (Sasa & Okazawa, 1994: 77, plate 6 fig. 9; Sasa & Kikuchi 1995: 191, plate 68D) *H. nebulosa*, spec. nov. can be easily separated from both on the presence of lanceolate setae on the thorax and on hypopygial features. *H. osarumaculata* and *H. otujimaculata* both have an evenly rounded tergum IX, lacking the small rounded tip found in *H. nebulosa*. *H. osarumaculata* has a large, rectangular inferior volsella, resembling the weaker, triangular volsella found in *H. nebulosa*, while *H. otujimaculata* has a broad, rounded inferior volsella, distinctly different to the one in *H. nebulosa*. In *H. osarumaculata* the virga is longer (100  $\mu\text{m}$ ), brush-like, and composed of numerous spines, while the length of the virga in *H. otujimaculata* (75  $\mu\text{m}$ ) falls within the range of the virga length of *H. nebulosa*, but it is horse-shoe formed and composed of "19 strong fibres". *H. nebulosa* also differs from the two Japanese species in other features. *H. osarumaculata* has two conspicuous dark-purplish wing spots, which appear to be more restricted than in *H. nebulosa* spec. nov., i.e. the distal spot do not extend below  $\text{Cu}_1$ . Also in the colour of body and legs the new species clearly differs; *H. osarumaculata* has e.g. entirely yellow tibia and tarsi of middle and hind legs. *H. nebulosa* is clearly smaller than *H. osarumaculata*, wing length is 0.92-1.24, 1.04 mm compared to 1.41-1.51 mm. The AR is lower, 0.44-0.72, 0.55 compared to 0.81. Further, the new species has fewer setae on head and thorax, it has e.g. only 8-14, 10 temporal setae in a single row, while *H. osarumaculata* has 18-24 setae in a double row.

*H. otujimaculata* has two large, conspicuous bluish wing spots, which appear to be even larger than in the new species. *H. otujimaculata* is a very small species with a wing length of only 0.88 mm compared to 0.92-1.24, 1.04 mm in *H. nebulosa*. However, most ratios and setal counts appear to fall within the range of *H. nebulosa*.

The female from China most probably also represent a distinct species. The females of *H. osarumaculata* and *H. otujimaculata* are not known, but in having lanceolate setae on the thorax it is highly improbable that the female from China represent the female of any of these species. The female from China also differs from the female of *H. nebulosa*, it is somewhat larger and appears to have brownish wing marks. However, until the male is discovered, the species should not be named.

In most instances intersexualities or morphological changes of sexual dimorphous characters in chironomids are caused by parasitism, particularly by mermithids (Nematoda), although intersexes accountable to gynandromorphism are also known (e.g. Aagaard 1974, Sæther & Galloway 1980, Wülker 1961a, b). In male Chironomini the essential morphological changes due to mermithid parasitism are reduced length of tarsal bristles, feminized antenna, female structures on the VIII abdominal sternite and reduction or absence of ductus ejaculatorius (Wülker 1975). Apart from no noticeable reduction in the bristle ratio of the front legs, the morphological changes observed in the intersexes of *H. nebulosa* coincide with the changes caused by mermithid parasitism. The fact that intersexes were found in one locality only, in the Malaise trap catches at a small stream near Wat Phra That temple on Doi Suthep, strengthen the assumption that the morphological changes were caused by parasitism. However, no parasites were detected in these specimens, but mermithids are known to leave their host when collected in preservation fluid (Aagaard 1974).

The size of the intersexes apparently falls outside the range of the males in several of the structures measured and the body proportions as reflected in the ratios, can be outside the range of both males and females, see Tab. 1. As the morphological changes seemingly can be very subtle, care must be taken not to include intersexes when describing new species.

## Acknowledgements

Financial support for the excursion to Thailand was given by the University of Bergen. We are much indebted to Prof. Ole A. Sæther, Bergen, for valuable advise and discussions, and to Dr. Friedrich Reiss, Munich, for the loan of material of *H. nebulosa*, spec. nov. from Thailand. Gladys Ramirez made most of the slide preparations.

## References

- Aagaard, K. 1974. Morphological changes caused by nematode parasitism in Tanypodinae (Diptera, Chironomidae). – Norsk ent. Tidsskr. **21**: 11-14
- Cranston, P. S., D. R. Oliver, & O. A. Sæther 1989. 9. The adult males of Orthocladiinae (Diptera: Chironomidae) of the Holarctic region. Keys and diagnoses. In: Wiederholm, T. (ed.): Chironomidae of the Holarctic region. Keys and diagnoses. Part 3. Adult males. – Ent. scand. Suppl. **34**: 165-352
- Giani, N. & V. Bouguenec 1988. La faune aquatique de Thaïlande généralités et catalogue. – Expéditions de l'APS en Asie du Sud-Est, travaux scientifiques **1**: 29-38
- Moubayed, Z. 1988. Chironomidae (Diptera) de Thaïlande récoltés par l'expédition Thai 87. – Expéditions de l'APS en Asie du Sud-Est, travaux scientifiques **1**: 41-42
- Reiss, F. 1968. Neue Chironomiden-Arten (Diptera) aus Nepal. – Khumbu Himal. **3** (1): 55-73
- Sasa, M. 1988. Studies on the chironomid midges collected from lakes and streams in southern Hokkaido Island, Japan. – Res. Rep. natn. Inst. envir. Stud. Japan **121**: 9-75
- & M. Kikuchi 1995. Chironomidae (Diptera) of Japan. – University of Tokyo press, 333 pp.
- & T. Okazawa 1994. Part 2. Additional information on the Chironomidae of the Hokuriku Region, pp. 68-87. In: Some Characteristics of water quality and aquatic organism in the Chief Lakes in Toyama Prefecture (Lake Arimine, Kamiichigawa Reservoir). – Research Report from the Toyama Prefectural environmental Science Research Center, 148 pp.
- Sæther, O. A. 1969. Some Nearctic Podominae, Diamesinae, and Orthocladiinae (Diptera: Chironomidae). – Bull. Fish. Res. Bd Can. **170**: 1-154
- 1980. Glossary of chironomid morphology terminology (Diptera: Chironomidae). – Ent. scand. Suppl. **14**: 1-51
- 1990. A review of the genus *Limmophyes* Eaton from the Holarctic and Afrotropical regions (Diptera: Chironomidae, Orthocladiinae). – Ent. scand. Suppl. **35**: 1-139
- & T. D. Galloway 1980. Sexual anomalies in Chironomini (Chironomidae: Diptera) from Lake Winnipeg, Manitoba, with observations on mermithid (Nematoda) parasites. – Act. Univ. Carol.-Biol. **1978**: 193-211
- Wülker, W. 1961a. Untersuchungen über die Intersexualität der Chironomiden (Dipt.) nach Paramermis-Infektion. – Arch. Hydrobiol. Suppl. **25**: 127-181
- 1961b. Parasitäre und nichtparasitäre geschlechtliche Aberrationen bei Chironomiden (Dipt.). – Zool. Anz. Suppl. **25**: 132-139
- 1975. Parasite-induced castration and intersexuality in insects, pp. 121-134. In: Reinboth, R. (ed.): Intersexuality in the Animal Kingdom. – Springer. Heidelberg.